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(54) **DISPLAYING ACTIVE CURSOR IN MOBILE TERMINAL**

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(51) **Int. Cl.**
G06F 3/048 (2006.01)

(52) **U.S. Cl.** **715/859**; 715/821; 715/861

(58) **Field of Classification Search** 715/810, 715/811, 821, 823, 825, 835, 856–861, 864
See application file for complete search history.

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(57) **ABSTRACT**

A mobile communication terminal and a method of multi-tasking in the terminal are provided. The mobile communication terminal displays a first task display associated with a first application task, receives a request to execute a second application task while the first application task is being performed, and displays a second task display associated with the second application task, wherein the second task display at least partially replaces the first task display, at least a portion of the second task display is identified by an active cursor configured to allow a user to select a function associated with the second application task, and at least one display feature of the active cursor indicates that the first application task is being concurrently performed.

17 Claims, 6 Drawing Sheets

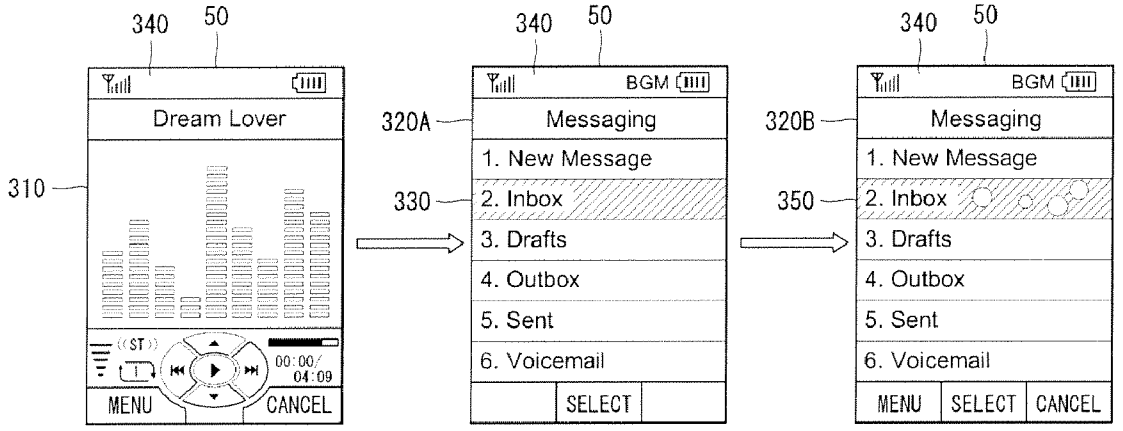


FIG. 1

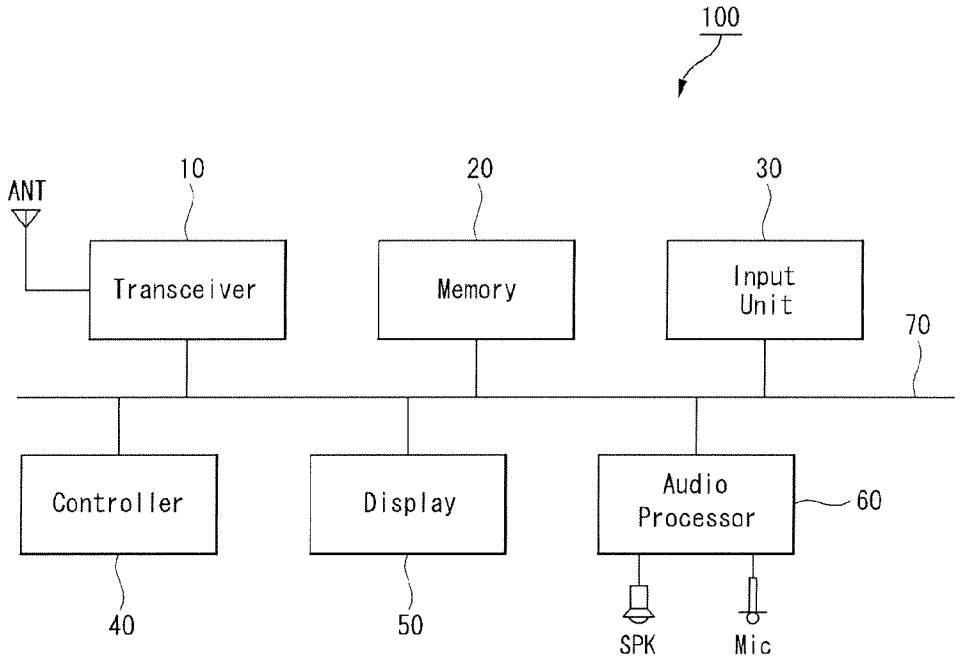

100
ANT
10
20
30
Transceiver
Memory
Input Unit
70
Controller
Display
Audio Processor
60
40
50
SPK
Mic

FIG. 2

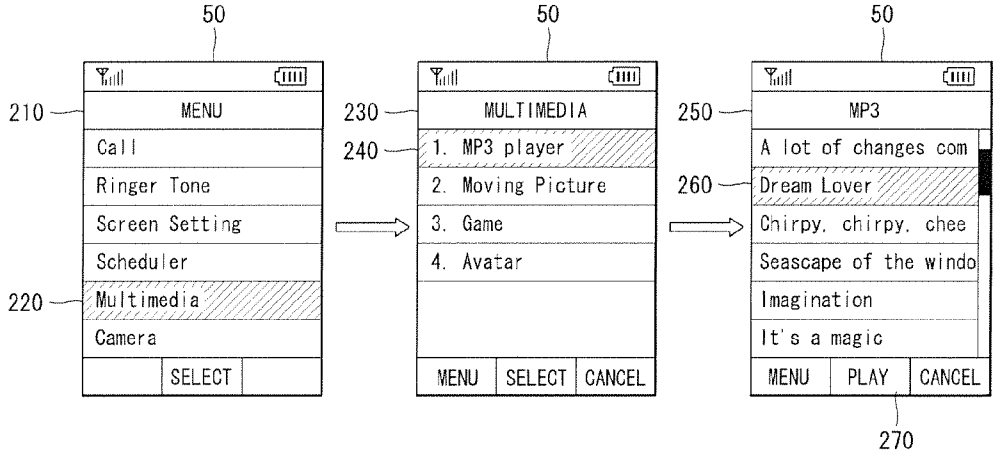

50
50
50
210
MENU
Call
Ringer Tone
Screen Setting
Scheduler
220
Multimedia
Camera
SELECT
230
MULTIMEDIA
240
1. MP3 player
2. Moving Picture
3. Game
4. Avatar
MENU
SELECT
CANCEL
250
MP3
A lot of changes com
260
Dream Lover
Chirpy, chirpy, chee
Seascape of the windo
Imagination
It's a magic
MENU
PLAY
CANCEL
270

FIG. 3

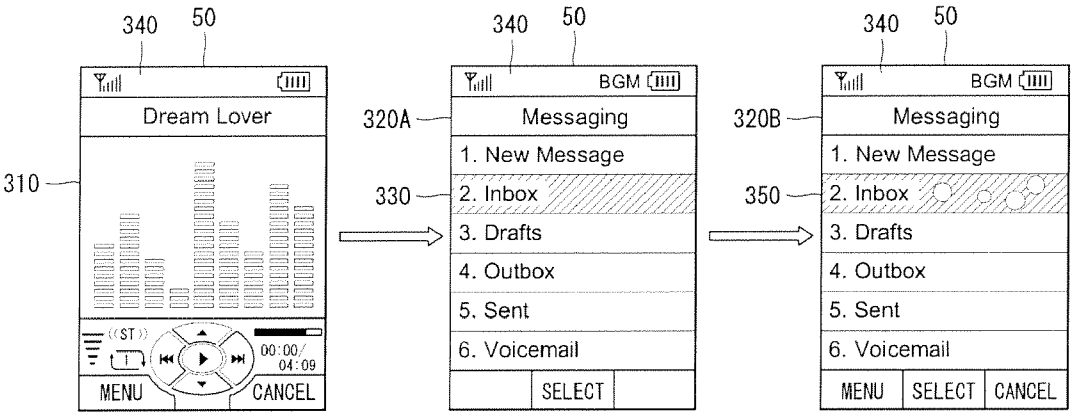

340
50
Dream Lover
310
00:00/
04:09
MENU
CANCEL
320A
Messaging
1. New Message
330
2. Inbox
3. Drafts
4. Outbox
5. Sent
6. Voicemail
SELECT
BGM
320B
350

FIG. 4A

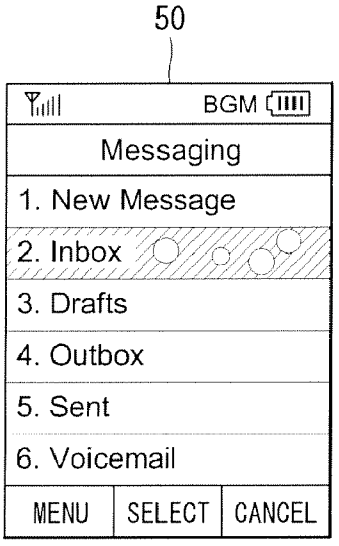

50
BGM
Messaging
1. New Message
2. Inbox
3. Drafts
4. Outbox
5. Sent
6. Voicemail
MENU
SELECT
CANCEL

FIG. 4B

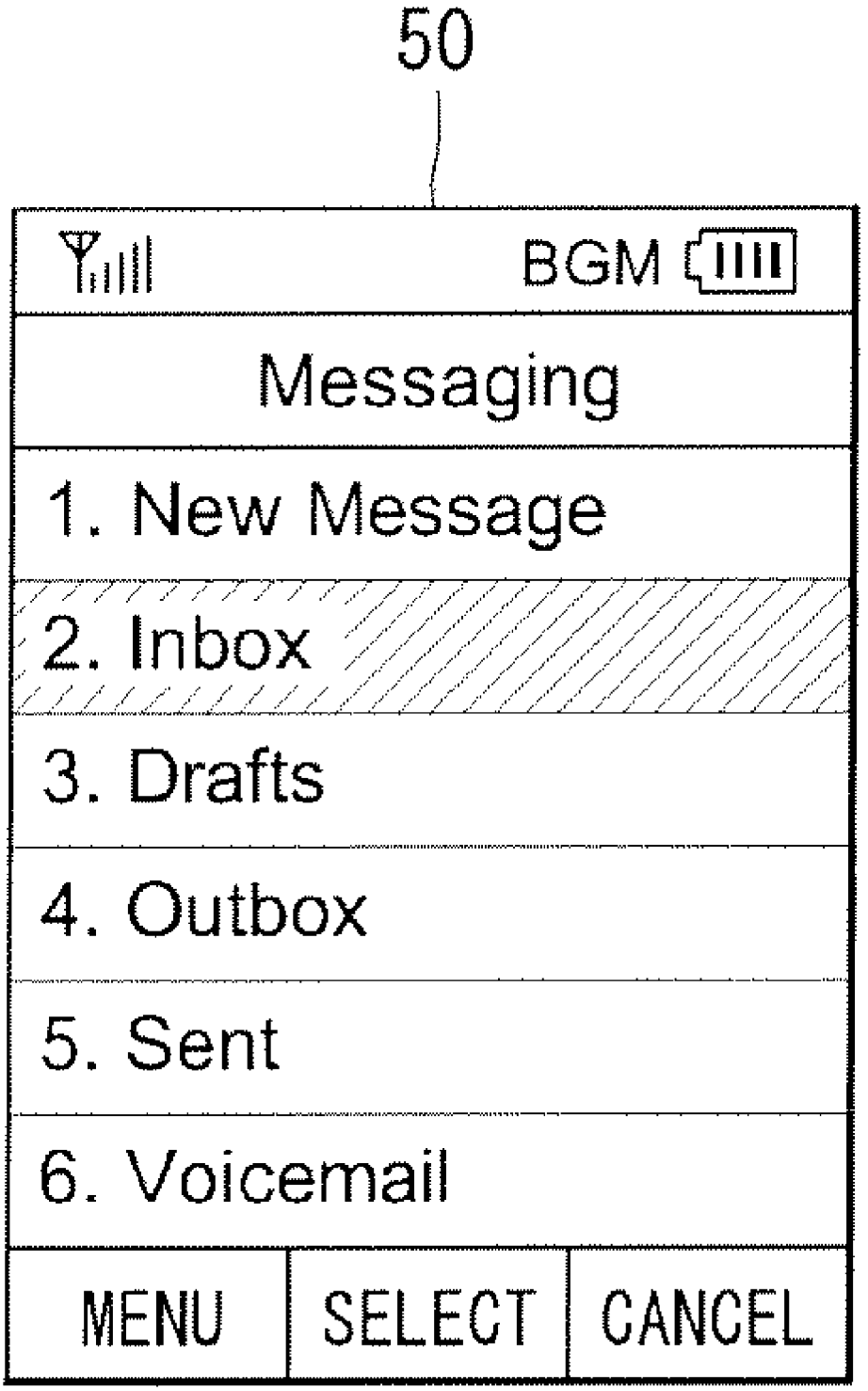

50
BGM
Messaging
1. New Message
2. Inbox
3. Drafts
4. Outbox
5. Sent
6. Voicemail
MENU
SELECT
CANCEL

FIG. 5

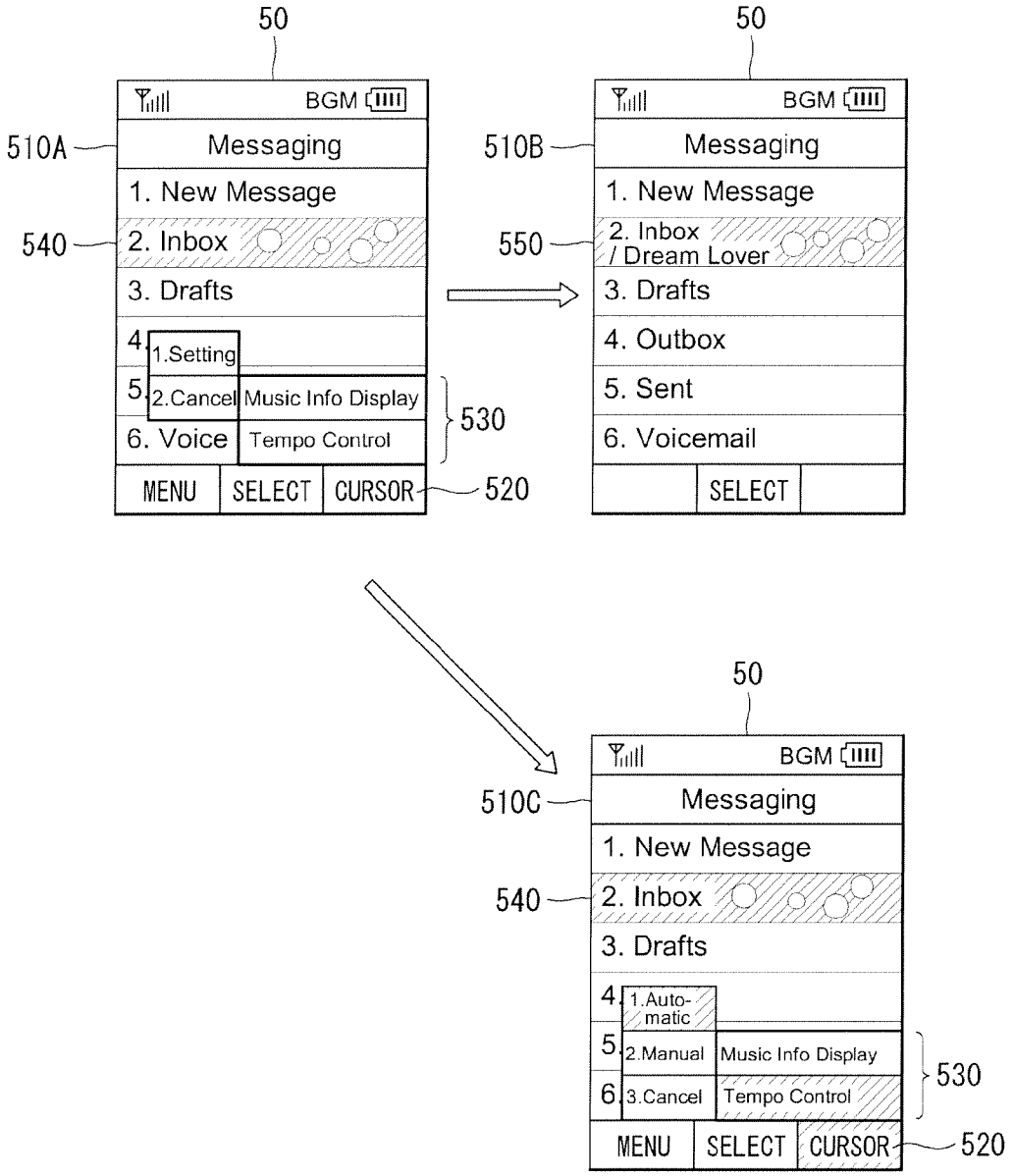

50
BGM
510A
Messaging
1. New Message
540
2. Inbox
3. Drafts
4
1.Setting
5
2.Cancel
Music Info Display
6. Voice
Tempo Control
530
MENU
SELECT
CURSOR
520
50
BGM
510B
Messaging
1. New Message
550
2. Inbox
/ Dream Lover
3. Drafts
4. Outbox
5. Sent
6. Voicemail
SELECT
50
BGM
510C
Messaging
1. New Message
540
2. Inbox
3. Drafts
4
1.Auto-
matic
5
2.Manual
Music Info Display
6
3.Cancel
Tempo Control
530
MENU
SELECT
CURSOR
520

FIG. 6

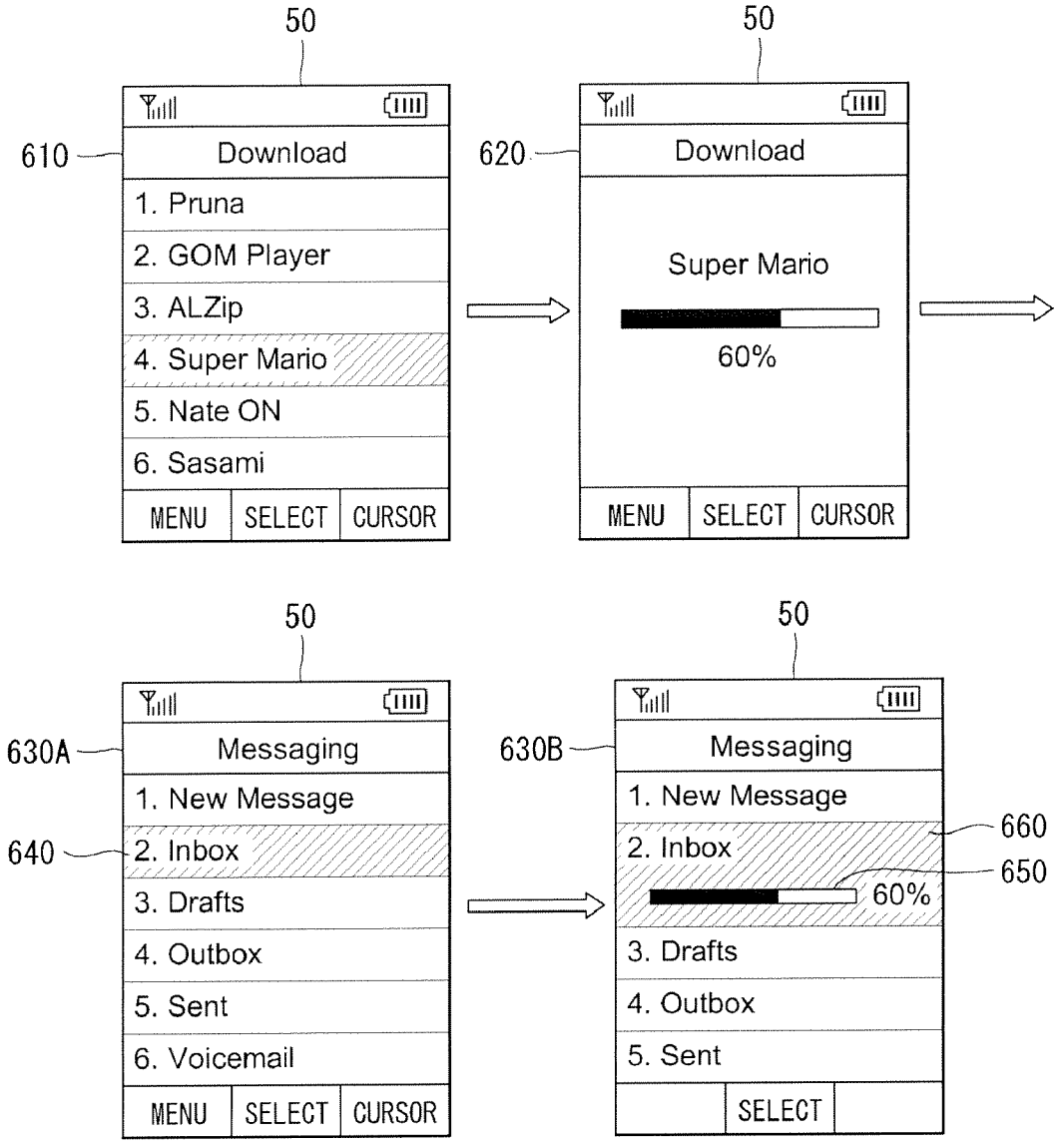

50
610
Download
1. Pruna
2. GOM Player
3. ALZip
4. Super Mario
5. Nate ON
6. Sasami
MENU
SELECT
CURSOR
50
620
Download
Super Mario
60%
MENU
SELECT
CURSOR
50
630A
Messaging
1. New Message
640
2. Inbox
3. Drafts
4. Outbox
5. Sent
6. Voicemail
MENU
SELECT
CURSOR
50
630B
Messaging
1. New Message
660
2. Inbox
650
60%
3. Drafts
4. Outbox
5. Sent
SELECT

FIG. 7A

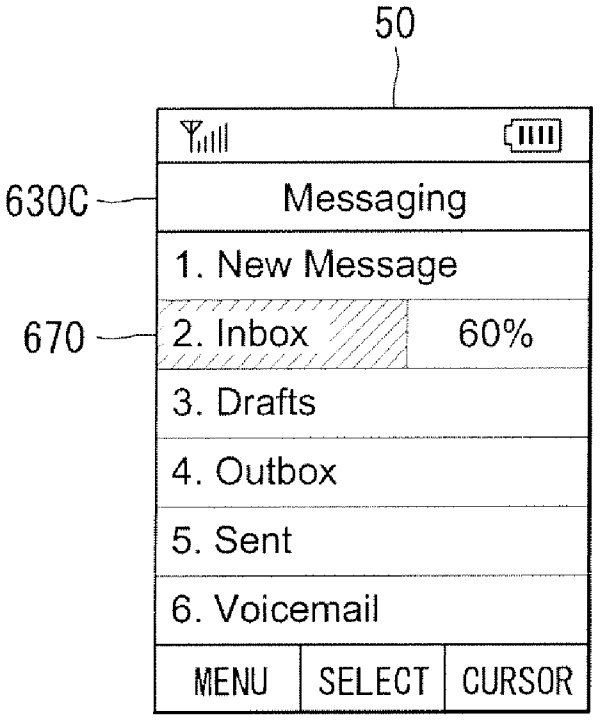
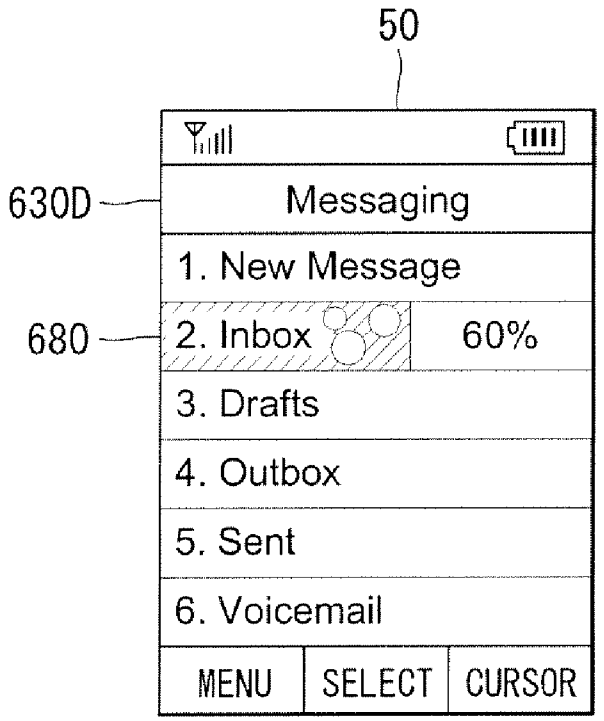

50
630C
Messaging
1. New Message
670
2. Inbox
60%
3. Drafts
4. Outbox
5. Sent
6. Voicemail
MENU
SELECT
CURSOR

FIG. 7B


50
630D
Messaging
1. New Message
680
2. Inbox
60%
3. Drafts
4. Outbox
5. Sent
6. Voicemail
MENU
SELECT
CURSOR

DISPLAYING ACTIVE CURSOR IN MOBILE TERMINAL

CROSS-REFERENCE TO RELATED APPLICATIONS

Pursuant to 35 U.S.C. §119(a), this application claims the benefit of earlier filing date and right of priority to Korean Application No. 10-2007-0036757, filed on Apr. 16, 2007, the contents of which are hereby incorporated by reference herein in their entirety.

FIELD OF THE INVENTION

The present invention is directed to multi-tasking and displaying an active cursor in a mobile terminal.

DESCRIPTION OF THE RELATED ART

Recently, a mobile terminal has been developed to achieve a high processing speed and a high memory capacity to support multitask operations. The mobile terminal with multitask capability processes and displays a most recently executed application on top of a display or in a foreground while processing and displaying other executed applications previously initiated in a background. The mobile terminal with multitask capability displays, for example, a Background Music (BGM) indicator to indicate that an MPEG-1 Audio layer 3 (MP3) file is being reproduced in the background when another application is being executed in the foreground.

SUMMARY OF THE INVENTION

In one general aspect, a method of multi-tasking in a mobile terminal includes displaying a first task display associated with a first application task in the mobile terminal, receiving a request to execute a second application task while the first application task is being performed, and displaying a second task display, the second task display associated with the second application task and at least partially replacing the first task display, wherein at least a portion of the second task display is identified by an active cursor configured to allow a user to select a function associated with the second application task and at least one display feature of the active cursor indicates that the first application task is concurrently being performed.

In one embodiment, the second task display includes a menu list corresponding to the second application task, at least one item of the menu list identified by the active cursor. The display feature of the active cursor may include at least one of color, color tone and fading. Additionally, the display feature of the active cursor may include at least one of still and moving images.

In another embodiment, the first application task includes an MP3 file reproduction function and the moving images move in response to a tempo of music played via the MP3 file reproduction function.

In another embodiment, the active cursor includes at least one additional display feature that corresponds to at least one additional application task being performed concurrently with the first and the second application tasks. The additional display feature may be selectively determined by the user.

Preferably, the active cursor includes status information associated with the first application task. The status information may include one of text information and a progressive bar graph. The display feature of the active cursor may be initiated a predetermined time after displaying the second task display.

In another aspect, a terminal includes an input unit for receiving a request to perform a first application task and a request to perform a second application task, the request to perform the second application task received while the first application task is being performed; a display for displaying a first task display associated with the first application task and a second task display associated with the second application task, the second task display at least partially replacing the first task display; and a controller for displaying an active cursor on the second task display, wherein at least one display feature of the active cursor indicates that the first application task is being concurrently performed.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other features and advantages of the present invention will become more apparent by describing in detail preferred embodiments thereof with reference to the attached drawings.

FIG. **1** is a block diagram illustrating an exemplary mobile communication terminal according to an embodiment of the present invention.

FIGS. **2** and **3** illustrate screens displaying cursors according to an embodiment of the present invention.

FIGS. **4**A and **4**B illustrate screens displaying active cursors according to an embodiment of the present invention.

FIGS. **5** and **6** illustrate screens displaying active cursors according to another embodiment of the present invention.

FIGS. **7**A and **7**B illustrate screens displaying active cursors according to yet another embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following detailed description, reference is made to the accompanying drawing figures which form a part hereof, and which show by way of illustration specific embodiments of the invention. It is to be understood by those of ordinary skill in this technological field that other embodiments may be utilized, and structural, electrical, as well as procedural changes may be made without departing from the scope of the present invention. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or similar parts.

Referring to FIG. **1**, a mobile communication terminal **100** according to the present invention includes a transceiver **10**, a memory unit **20**, an input unit **30**, a controller **40**, a display **50**, and an audio processor **60**.

The transceiver **10** transmits and receives signals to and from a base station (not shown) to perform a communication function for the mobile communication terminal **100**.

The memory unit **20** stores programs and data for controlling overall operations of the mobile communication terminal **100**. The memory unit **20** further stores files such as MP3 files, video files, and image files. The memory unit **20** may also store a program for a real-time operating system to support multitask operations of the mobile communication terminal **100**.

The input unit **30** includes various buttons for inputting information such as numbers and characters. The input unit **30** further includes function buttons for manipulating various functions and direction buttons for selecting a specific direction to move a cursor. The input unit **30** is implemented as a

key pad, a touchpad, a jog dial, a touch screen, or a joystick. The input unit **30** receives a command from a user to perform a specific task by transferring the input command to the controller **40**.

The controller **40** is a processor that performs overall control operations of the mobile communication terminal **100** based on the programs and data stored in the memory unit **20**. The controller **40** controls and manages the multitask operations using the program for the real-time operating system stored in the memory unit **20**.

For example, the controller **40** manages to execute a plurality of tasks in parallel based on a priority preset according to factors such as their urgency and importance. The controller **40** receives a command to operate the specific task from the input unit **20** while operating another task such as reproducing or downloading certain contents.

Accordingly, the controller **40** performs multitask operations to perform the specific task in the foreground and display a screen related to the specific task on the display **50**. The controller **40** also displays an active cursor on the screen related to the specific task in the foreground to visually indicate that another task is being performed in the background. For example, the active cursor may indicate that certain contents are being reproduced or downloaded in the background.

The display **50** displays on a screen a variety of information output from the mobile communication terminal **100**. The screen may include a menu screen. The display **50** may include a Liquid Crystal Display (LCD) or an Organic Light Emitting Diode (OLED).

The display **50** may include more than one display devices, such as an external display device and an internal display device. The display **50** may display an active cursor under the control of the controller **40**. The active cursor may display in its interior at least one graphic pattern such as a rhythmical motion.

The audio processor **60** processes audio signals decoded by the controller **40** to output specific sound through a speaker SPK under the control of the controller **40**. The audio processor **60** further processes audio signals from a microphone MIC to transmit the processed audio signals to the controller **40**.

Referring to FIG. **2**, cursors **220**, **240**, and **260** are shown on screens **210**, **230**, and **250**, respectively, of the display **50** of the mobile communication terminal **100**. A cursor generally refers to a pointer, a moving icon or position markers of the pointing device. In a graphical user interface as often used in the mobile communication terminal **100**, the cursor is often a blinking line or bar that is used to indicate which submenu or item in a menu or list is selected by highlighting or distinguishing the selected submenu or item from other submenus or items. In general, the cursor is monotonous and displayed in a single solid color. In the present invention, an "active cursor" is distinguished from the common cursor and is characterized by changing colors, or graphic image/motion of waves or bubbles in the cursor.

In FIG. **2**, a 'Multimedia' **220** is selected from an initial 'MENU' screen **210** showing a list of submenus. Then, a 'MULTIMEDIA' **230** menu screen showing a list of a plurality of the multimedia submenus is displayed on the display **50**. An 'MP3 player' menu **240**, for example, is selected from the 'MULTIMEDIA' **230** menu screen. As a result, the mobile communication terminal **100** transitions to an 'MP3' **250** play mode and displays a list of MP3 files stored in the memory unit **20** on the display **50**.

In the list of the MP3 files displayed on the display **50**, the user moves a cursor to a desired MP3 file, for example, 'Dream Lover' **260**, and selects a 'PLAY' menu **270** to play the selected MP3 file. Alternatively, the display **50** may be a touch screen and tapping on the name of the desired MP3 file, for example, 'Dream Lover' **260**, will play the tapped file.

After the MP3 file is selected as described above in connection with FIG. **2**, the display **50** displays a play screen **310**, as shown in FIG. **3**, to play the selected MP3 file. Referring to FIG. **3**, the user may further request to perform another task while the MP3 file is being played.

Another task is then executed in the foreground while the MP3 file is being played in the background. For example, the user may request to enter a message mode by manipulating the input unit **30** while the MP3 file is being played as shown in the play screen **310**. In response to the user's input, the mobile communication terminal **100** transitioned to the message mode to display a 'Messaging' menu screen **320**A showing a list of message submenus such as 'New Message', 'Inbox', 'Drafts', and 'Outbox' on the foreground while the MP3 file is being played in the background.

On the displayed list of message submenus, a cursor **330** for selecting a desired menu is placed on one of the message submenus. The message menu screen **320**A may display in an indicator area **340** a 'BGM' indicator to indicate that the MP3 file is being played in the background.

After a predetermined time lapses, for example 0.1 second, the message menu screen **320**A may be changed into a modified screen **320**B. In the modified screen **320**B, the initial cursor **330** of the initial message menu screen **320**A has been changed into an active cursor **350** having at least one graphic pattern displaying a rhythmical motion, for example, a pattern with polka dots in rhythmical movements.

FIGS. **4**A and **4**B illustrate screens displaying examples of active cursors. As described above, the mobile communication terminal **100** may change the cursor **330** into the active cursor **350** having a specific pattern with rhythmic motions if the MP3 file is being played in the background while the multitask processing is performed. Therefore, from the specific pattern of the active cursor **350**, the user may instantly notice that the MP3 file is being played in the background.

The described implementation is merely exemplary, and many variations may be applied to the implementation. For example, the active cursor **350** may be displayed to inform that a moving picture is being reproduced or a specific file is being downloaded in the background while another task is performed in the foreground.

According to the above description, the cursor **330** is displayed on the screen **320**A for processing the new task and then changed into the active cursor **350** after the predetermined time has lapsed after initiating the multitask processing. Alternatively, the active cursor **350** may be displayed instantly upon initiating the new task and the screen **320**B for the new task displayed on the display **50**.

Referring to FIG. **5**, the mobile communication terminal **100** transitions to the message mode to display a message menu screen **510**A while playing the MP3 file. The message menu screen **510**A shows the list of message submenus with the active cursor **540** placed at one of the menus in the list.

If the user selects a 'CURSOR' menu **520** at a lower end of the message menu screen **510**A under the list of the message submenus, a popup window **530** is displayed on the message menu screen **510**A. The popup window **530** provides a 'Music information Display' menu and a 'Tempo Control' menu.

If the user places a cursor at the 'Music information Display' menu and presses a 'SELECT' menu on the left side of the 'CURSOR' menu **520**, submenus, such as a 'Setting' and a 'Cancel' menu, are displayed in another popup window on the left side of the popup window **530**. If the user selects the

'Setting' menu, the 'Messaging' menu screen **510**A is turned into a screen **510**B in which the active cursor **550** displays a name of the MP3 file being played within the active cursor **550**. For example, 'Inbox/Dream Lover' is displayed within the active cursor **550** while the MP3 file of 'Dream Lover' is being played in the background.

If the user moves the cursor to the 'Tempo Control' menu in the popup window **530** and presses the 'SELECT' menu, submenus, such as an 'Automatic,' a 'Manual,' and a 'Cancel' menu, are displayed in another popup window on the left side of the popup window **530** on the message menu screen **510**C. If the 'Automatic' menu is selected, a tempo of the motion of the pattern displayed within the active cursor **540** may be adjusted in accordance with a tempo of the MP3 file being reproduced. For example, the pattern may move in a faster tempo if the tempo of the MP3 file increases.

If the 'Manual' menu is selected, the user may set the tempo of the motion of the pattern in the active cursor **540** to one of available predetermined tempos and the tempo of the displayed motion will be constant regardless of the variation of the tempo in the MP3 file being played. For example, the predetermined tempo of the motion of the pattern may be available as 'very slow,' 'slow,' 'normal,' 'fast,' or 'very fast.'

If the user selects the 'Cancel' menu in the popup window **530**, the pattern displayed in the active cursor **540** may move in a predetermined tempo set by the mobile communication terminal **100**.

According to the above description, when the user selects the 'Music Info Display' menu, the name of the MP3 file is displayed within the active cursor **540**. Alternatively, information regarding the MP3 file, such as lyrics, artist information or a play order of the MP3 files may be displayed within the active cursor **540**.

Referring to FIG. **6**, if the user selects a connection to the Internet in order to download specific content, the display **50** displays a screen **610** showing a list of contents available for download. If the user moves the cursor to a desired content in the list and presses the 'SELECT' menu, the display **50** displays a screen **620** to indicate that the selected content is being downloaded.

If the user selects the message mode while the selected content is being downloaded, the mobile communication terminal **100** transitions to the message mode and displays a 'Messaging' menu screen **630**A showing a list of message submenus in the foreground while downloading the desired content in the background. A cursor **640** may be placed on any one of the message submenus listed in the 'Messaging' menu screen **630**A.

A progressive bar **650** may be displayed inside the cursor **660** after a predetermined time has lapsed, in a manner similar to screen **630**B in order to show the progress of the download. Therefore, the user is able to check the progress of the download in the message mode.

As described above, the mobile communication terminal **100** may change the cursor **640** to display the progressive bar **650** within the cursor **660** after the predetermined time has lapsed. Alternatively, the cursor **660** may display the progressive bar **650** as soon as the message menu screen **630**A is displayed in the foreground in response to the user's command.

Further, rather than displaying the progressive bar **650** within the cursor **660**, the cursor **670** itself may be implemented as a progressive bar to show the progress of the downloading as in a screen **630**C shown in FIG. **7**A. Furthermore, as illustrated by the cursor **680** displayed on a 'Messaging' menu screen **630**D in FIG. **7**B, the cursor **680** may be implemented as a progressive bar having a pattern with a rhythmical motion similar to that illustrated in FIGS. **3** and **4**.

The foregoing embodiments and advantages are merely exemplary and are not to be construed as limiting the present invention. The present teaching can be readily applied to other types of apparatuses and processes. The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art.

What is claimed is:

1. A method of multi-tasking in a mobile terminal, the method comprising:

displaying a first task display associated with a first application task in the mobile terminal;

receiving a request to execute a second application task while the first application task is being performed; and

displaying a second task display comprising a menu list that is associated with the second application task,

wherein the second task display further comprises an active cursor for identifying at least one item of the menu list, the active cursor indicating progress or status information associated with the first application task that is being performed when the at least one item associated with the second application task is selected from the menu list, and wherein the menu list is not associated with the first application task.

2. The method of claim **1**, wherein the active cursor comprises at least one of color, color tone and fading.

3. The method of claim **1**, wherein the active cursor comprises at least one of still and moving images.

4. The method of claim **3**, wherein the first application task comprises an MP3 file reproduction function and the moving images move in response to a tempo of music played via the MP3 file reproduction function.

5. The method of claim **1**, wherein the active cursor comprises at least one display feature that corresponds to at least one additional application task being performed concurrently with the first and the second application tasks.

6. The method of claim **5**, wherein the at least one display feature is selectively determined by the user.

7. The method of claim **1**, wherein the status information comprises one of text information and a progressive bar graph.

8. The method of claim **1**, wherein the active cursor is initiated a predetermined time after displaying the second task display.

9. A terminal comprising:

an input unit for receiving a request to perform a first application task and a request to perform a second application task, the request to perform the second application task received while the first application task is being performed;

a display for displaying a first task display associated with the first application task and a second task display associated with the second application task, the second task display comprising a menu list that is associated with the second application task and an active cursor identifying at least one item of the menu list; and

a controller for causing displaying of the active cursor on the at least a one item of the menu list, the active cursor indicating progress or status information associated with the first application task that is being performed when the at least one item associated with the second application task is selected from the menu list,

wherein the menu list is not associated with the first application task.

10. The terminal of claim 9, wherein the active cursor comprises at least one of color, color tone and fading.

11. The terminal of claim 9, wherein the active cursor comprises at least one of still and moving images.

12. The terminal of claim 11, wherein the first application task comprises an MP3 file reproduction function and the moving images move in response to a tempo of music played via the MP3 file reproduction function.

13. The terminal of claim 9, wherein the active cursor comprises at least one display feature that corresponds to at least one additional application task being concurrently performed with the first and the second application tasks.

14. The terminal of claim 13, wherein the at least one display feature is selectively determined by the user.

15. The terminal of claim 9, wherein the status information comprises one of text information and a progressive bar graph.

16. The terminal of claim 9, wherein the active cursor is initiated a predetermined time after displaying the second task display.

17. A method of controlling multi-tasking in a mobile terminal, the method comprising:

displaying a first task display associated with a first application task at a display of the mobile terminal;

receiving a request to execute a second application task while the first application task is being performed;

displaying a second task display in response to the request, the second task display comprising a menu list including the second application task and a cursor for selecting at least one menu item in the menu list;

converting the cursor into an active cursor when selecting the second application task from the menu list, the active cursor identifying the selected second application task and indicating progress or status information associated with the first application task that is being performed; and

executing the selected second application and the first application concurrently.

* * * * *